



**UNITED STATES PATENT AND TRADEMARK OFFICE**

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/807,394	04/12/2001	Henning Henningsen	GRP-0001	9224

23413 7590 03/14/2003

CANTOR COLBURN, LLP  
55 GRIFFIN ROAD SOUTH  
BLOOMFIELD, CT 06002

EXAMINER
----------

LUK, EMMANUEL S

ART UNIT	PAPER NUMBER
----------	--------------

1722

DATE MAILED: 03/14/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/807,394

Applicant(s)

HENNINGSEN, HENNING

Examiner

Emmanuel S. Luk

Art Unit

1722

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 January 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Pri rity under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                   | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)          | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. | 6) <input type="checkbox"/> Other: _____.                                   |

### DETAILED ACTION

1. The previously indicated allowability of claims 1-20 are withdrawn in view of reference(s) to Fudim. Rejections based on the cited reference(s) follow.

#### ***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 5, 7, 8, 10, 11 and 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Fudim.

Fudim teaches the claimed apparatus and method having a rapid prototyping machine for manufacturing 3-D objects(19), the apparatus having at least one light source (18) for illumination of a cross section of the light-sensitive material (11) by at least on spatial light modulator of individually controllable light modulators (20), wherein the at least one light source is optically coupled to a plurality of light guides (13) arranged with respect to the spatial light modulator arrangement in such a manner that each light guide illuminates a sub-area of the cross section (Col. 4, lines 42-48). The spatial modulator arrangement comprises transmissive light valves, optical fibers (14) constitute the optical light guides (13), the individual light valves are arranged in rows in a transverse direction of a surface at a given mutual distance, the rows being mutually displaced in the transverse direction (Fig. 4), the exposure head (18) comprising a bar having relative movement by the drives (16, 21) over the illumination surface, the optical means for spreading the light beams over the illumination surface.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 4, 6, 9, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fudim in view of Hull (4,929,402).

Fudim teaches the claimed apparatus as shown above. Fudim fails to teach micro lens, a short arc gap lamp, control circuitry and electromechanical light valves.

Hull teaches a rapid prototyping apparatus having a light source (26) using a 350 watt mercury short arc lamp in a housing focused on the end of a 1 mm diameter UV transmitting fiber optic bundle (Col. 7, lines 44-49). The bundle having an electronically controlled shutter blade between the lamp and the end of the bundle, that can turn the light through the bundle on and off, the optical output is fitted into a lens tube that has a quartz lens to focus the UV to a spot (Col. 7, lines 50-55). Hull also teaches that a UV laser is a better light source than a short arc lamp (Col. 5, lines 16-21) due to the intensity of the light source and the response of the UV curable liquid. Additionally, a computer (28) is utilized to control the basic functions of the stereolithographic functions.

The shutter blade is "electronically controlled" to turning the light in the bundle on and off, therefore the shutter blade is controlled by the computer. The shutter blade in conjunction with the fibers constitutes an electromechanical light valve. The computer

comprises of control circuitry for controlling the elements of the stereolithographic apparatus. The lens tube acts as the micro lens for focusing the light source upon the material.

It would have been obvious to one of ordinary skill in the art to modify Fudim with a short arc lamp, control circuitry and micro lens as taught by Hull because it improved curing capabilities of the rapid prototyping apparatus with better response and intensity.

5. Claims 12, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fudim in view of Penn.

Fudim teaches the claimed apparatus as shown above.

Fudim fails to teach a modulator comprising of an LCD, PDLC, PLZT, FELCD or Kerr cell and multi-mode fibers.

Penn teaches a rapid prototyping apparatus having an imager comprising of an LCD or LED, lasers, digital micro-mirrors, and other image projectors. Fudim does teach something similar to LED displays for use in the apparatus.

The multi-mode fibers are interpreted by the examiner as fibers being capable of transmitting the light at different frequencies and intensities. Fiber optics are capable of transmitting the light depending on the light source and therefore are capable of being multi-mode.

It would have been obvious to one of ordinary skill in the art to modify Fudim with LCD as taught by Penn for use in the apparatus since it is an equivalent device as shown by Penn.

6. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fudim in view of Hagenau.

Fudim teaches the use of an array of miniature individually controlled mirrors that can be employed to modulate irradiation of individual fibers (Col. 4, lines 53-57).

Fudim fails to mention DMD.

Hagenau teaches that a DMD, is a digital micromirror device, and that a DMD array of micromirrors (46) is constructed on a semiconductor memory chip (Col. 7, lines 42-51). That the projection optics are selected to magnify the reflected image from the DMD (Col. 8, lines 1-3). The use of DMD's are widely known in the art and in fact, Fudim does teach DMD's in light of the teachings of Hagenau.

It would have been obvious to one of ordinary skill in the art to recognize that the array of miniature individually controlled mirrors taught by Fudim are DMD's as shown by Hagenau.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel S. Luk whose telephone number is (703) 305-1558. The examiner can normally be reached on Monday through Friday 8 to 4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (703) 308-0457. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

Application/Control Number: 09/807,394

Page 6

Art Unit: 1722

872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

E.L.  
March 5, 2003

  
W. L. WALKER  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700